# Keep Solving And Nobody Explodes

Every Tick Counts.

# Bomb Defusal Manual

# Tangling Wires

## Description

The **Tangling Wires** module presents a set of colored wires (3 total) tangled in a grid. Each wire may be red, blue, green, or another color. The Defuser must determine **which wire(s) to cut** based on color patterns and logicules provided in the Expert Manual.

### 🔹 3-Wire Case

## Defuser View

- 3 visible wires arranged vertically or horizontally.
- Each wire is identified by its **color** and **position** (Top / Middle / Bottom or 1st / 2nd / 3rd).
- A **reference number** or **equation** appears on the screen.

## Expert Instructions

Follow the steps **in order** until a rule applies.
Once a rule applies, instruct the Defuser which wire(s) to cut and ignore all subsequent rules.

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#### Rule 1: Two Red Wires

If there are exactly **2 red wires**,
→ Solve **Question [no.]** from the *Question Bank*.

- If the **answer is odd**, instruct the Defuser to **cut the 1st wire**.
- If the **answer is even**, instruct the Defuser to **cut the last wire**.

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#### Rule 2: Blue and Green Adjacent

If **blue** and **green** wires are adjacent (next to each other),
→ Solve **Question [no.]** from the *Question Bank*.

- If the **answer is a multiple of 3**, instruct the Defuser to **cut the blue wire**.
- If the **answer is not a multiple of 3**, instruct the Defuser to **cut the green wire**.

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**Rule 3: Default Equation Rule**

If neither Rule 1 nor Rule 2 applies,
an **equation** will be displayed using the letters corresponding to the wires present.

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## 🔹 4-Wire Case

## Defuser View

- 4 wires are visible, labeled **1st**, **2nd**, **3rd**, and **4th** (or Top → Bottom).
- Each wire has a distinct **color** (e.g., Red, Blue, Green, Yellow, etc.).
- The screen will display either a **Question Number** (from the *Question Bank*) or an **Equation** to solve.

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## Expert Instructions

Follow the rules **in order**.
Once a rule applies, execute its action and **ignore all remaining rules**.

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**Rule 1: No Yellow Wire**

- If there are **no yellow wires** present:

1. Solve **Question [no.]** from the *Question Bank*.
2. Evaluate the answer and apply the conditions below:

- If the **answer is a multiple of 2**, instruct the Defuser to **cut the 1st and 3rd wires**.
- If the **answer is a multiple of 3**, instruct the Defuser to **cut all even-numbered wires** (2nd and 4th).
- If the **answer is a multiple of both 2 and 3**, instruct the Defuser to **cut the 1st and 4th wires**.
- If none of the above apply, instruct the Defuser to **cut the 2nd wire**.

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**Rule 2: More Than One Green Wire**

If there are **two or more green wires** present:

1. Solve **Question [no.]** from the *Question Bank*.
2. Evaluate the answer:
    - If the **answer is even**, instruct the Defuser to **cut all green wires**.
    - If the **answer is odd**, instruct the Defuser to **cut the rightmost green wire**.

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**Rule 3: Default Case (Otherwise)**

If neither Rule 1 nor Rule 2 applies:

1. Solve **Question [no.]** from the *Question Bank*.
2. Evaluate the answer:
    - If the **answer is even**, instruct the Defuser to **cut all odd-numbered wires** (1st and 3rd).
    - If the **answer is odd**, instruct the Defuser to **cut all even-numbered wires** (2nd and 4th)

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## 🔹 5-Wire Case

### Defuser View

- 5 wires are visible, labeled **1st**, **2nd**, **3rd**, **4th** and **5th** (or Top → Bottom).
- Each wire has a distinct **color** (e.g., Red, Blue, Green, Yellow, Black etc.).
- The screen will display either a **Question Number** (from the *Question Bank*) or an **Equation** to solve.

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## Expert Instructions

Follow the rules **in order**.
Once a rule applies, execute its action and **ignore all remaining rules**.

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**Rule 1: Four Same Colour Wire**

- If there is **1 Black Wir**e present:

  .Solve **Question [no.]** from the *Question Bank*.

- Evaluate the answer:
  - Find the approx **cube root** of the answer and cut the same wire
- If there is 1 Red wire present:

- Solve **Question [no.]** from the *Question Bank*.
- Evaluate the answer:
  - Find the approx **square root** of the answer and cut the same wire

Else

Solve **Question [no.]** from the *Question Bank*.

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**Rule 2: 3 same + 2 different (each different)**

"Dominant color with rogue wires"

- Identify the color that repeats 3 times.
- If the **dominant color is Red** → cut **the last Red wire**.
- If the dominant **color is Blue** → cut **the 2nd wire**.
- Else :cut **the unique color that appears before the 3rd Black**.

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**Rule 3: 2 same + 2 same + 1 different**

"Twin pairs and a spy"

- Identify the **unique wire** — check its position.
- If unique is **in position 3**, cut it.
- If unique is **in position 1 or 5**, cut **the opposite pair's second wire**.
- Else: cut **wire 4**.

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**Rule 4: 2 same + 3 different**

"Minor repeat pattern"

- If the repeated color is **Red**, cut **the first of its pair**.
- If the repeated color is **Blue**, cut **the wire after it** (next position).
- If the repeated color is **Green**, cut **the middle wire**.
- Else : reverse rule order.

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**Rule 5: All 5 wires different colors**

- **If the first wire is a primary color** (Red, Blue, or Yellow) → **Cut the last wire.**
- **Else if the middle wire (3rd)** is **secondary (Green)** →**Cut the middle wire.**
- **If the last wire is Red**, cut the **3rd wire.**
- **If none of the above apply** →Cut wire equal to

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# Chemical Chaos

## Description:

The Chemical Chaos module presents a set of colored beakers (3–5 total) arranged on a lab counter. Each beaker contains an unknown liquid, labeled only by color or chemical symbol. The Defuser must describe the appearance of each beaker — including color, label, and visible reaction signs such as bubbles, smoke, or glow — to determine the correct order of mixing.

## Defuser View:

- 3–5 beakers labeled A, B, C, D, and E.
- Each beaker displays a unique color or symbol.
- Mixing is performed in steps; only one pair can be combined at a time.
- Unstable reactions cause smoke or fizzing; stable reactions remain calm or turn colorless.

## Expert Instructions:

- Use the Defuser's description to infer each liquid's type (Acid, Base, Metal, Salt, or Water).
- Follow the reaction logic in the manual to determine the correct order and pairing of mixes.
- Once a stable sequence is found, instruct the Defuser step-by-step.
- Any incorrect sequence may result in instability or explosion.

## Visual Descriptive Clues for Beakers

| Sno | Beaker Observation | Chemical Type |
|---|---|---|
| 1. | Red liquid | Acid |
| 2. | Blue solution | Base |
| 3. | Clear liquid | Water |
| 4. | Gray | Metal |
| 5. | Pale yellow | Salt |
| 6. | Marked with “?” | Unknown / Wild card |

## 🔹 3 Beaker Case

**Rule 1: Acid–Base–Water**

- Mix Acid + Base first → Neutralization occurs (safe).
- Add Water last → Stabilizes completely.
- If water is mixed before neutralization → Explosion.

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**Rule 2: Acid–Metal–Water**

- Never mix Metal + Acid first → Hydrogen gas = Explosion.
- Mix Acid + Water first (dilution).
- Then add Metal slowly → Safe neutral reaction.

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**Rule 3: Base–Metal–Salt**

- Mix Base + Salt first → Slight neutralization, safe.
- If Metal is added before base, risk of oxidation → Unstable.
- Only add Metal last if both other liquids are already mixed.

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**Rule 4: All Reactive (Acid, Base, Metal)**

- Neutralize Acid + Base first.
- Do not add Metal afterward — isolate it.
- If Metal must be mixed, use Base + Metal instead (weak reaction, low risk).

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## 🔹 4 Beaker Case

**Rule 1: Acid–Metal–Water–Salt**

- Never mix Acid + Metal first → immediate explosion.
- Dilute Acid + Water first.
- Add salt to control ion balance.
- Introduce Metal last → safe mild reaction

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**Rule 2: Two Acids, One Base, One Unknown (“?”)**

- Mix Base + weaker Acid first (determine by lighter color).
- Test “?” by dipping a drop — if bubbles form, it’s reactive; discard.
- If there is no reaction, add “?” last — acts as stabilizer.

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**Rule 3: All Reactive (Acid, Base, Metal, Salt)**

- Neutralize Acid + Base first.
- Add salt next — acts as a shield.
- Add Metal last only if the previous reaction was stable.
- If any fizzing persists before the final mix → stop, instability risk.

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## 🔹 5 Beaker Case

**Rule 1: Full Set Present (Acid, Base, Metal, Salt, Water)**

- Mix Acid + Base → Neutralization.
- Add Salt next → Ionic stabilization.
- Add water for dilution.
- Metal must be added last — if fizzing occurs, stop immediately.

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**Rule 2: Two Acids Present**

- Identify stronger acid (darker color)
- Mix strong Acid + Base first → Neutral.
- Add weaker Acid next → mild reaction, manageable.
- Introduce Salt and Water for stabilization.

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**Rule 3: Unknown (“?”) Present**

- Mix Acid + Base → check for color change.
- Add salt next if there is no smoke.
- Test “?” by adding one drop —
    - If bubbles → Reactive (treat as Metal).
    - If color fades → Neutral (treat as Water).
- Proceed accordingly based on the result.

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**Rule 4: Multiple Metals or Reactive Pairings**

- If more than one Metal is present → do not mix directly.
- Pre-mix Acid + Water to form diluted acid.
- Add each Metal one by one.
- If any reaction produces continuous fizzing → stop mixing; isolate the last metal.

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**Rule 5: No Water Present**

- Create artificial dilution by mixing Acid + Salt first.
- Add Base next → observe mild heat.
- Introduce Metal only after reaction cools.
- If the temperature rises again → abort.

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# Light Merge

## Description:

Light Merge is a fast-paced cooperative physics puzzle where players use mirrors and lenses to merge light beams into a single target. Once the beams unite, a quiz on constants reveals a secret 4-letter code , the Diffuser shares it with the Expert, who consults the manual to pull the correct lever and defuse the bomb before time runs out.

## Diffuser View:

- Observe beams entering from different directions.
- Use **mirrors** to reflect and **lenses** to bend or merge beams.
- Merge all beams at the **green target point**.
- Answer 4 constant-based questions when beams unite.
- Form a **4-letter code** from your answers.
- Communicate the code to the **Expert** to defuse the bomb.

## Expert Instructions:

- Listen carefully to the **Diffuser's code**.
- **Refer to the manual** to decode the meaning of the 4-letter code.
- Identify the **correct lever sequence** based on the manual.
- Communicate clearly and quickly with the Diffuser.
- Pull the levers in the **exact sequence** — any mistake may trigger the bomb!

## Diffuser – Quiz of Constants

When beams merge, answer the 4 questions below.

Each correct answer gives **one letter** — combine them to form your **4-letter code**

| Question | Correct Answer | Code Letter |
|---|---|---|
| Which constant represents the speed of light? | Speed of Light | **c** |
| Which constant determines gravitational force between two masses? | Gravitational Constant | **G** |
| Which constant relates energy of a photon to its frequency? | Planck's Constant | **h** |
| Which constant is used to find wavenumber in hydrogen spectrum? | Rydberg Constant | **R** |
| Which constant measures electric charge of one electron? | Elementary Charge | e |
| Which constant represents Boltzmann's relation between energy and temperature? | Boltzmann Constant | **k** |

## Expert – Code Case Table

After the Diffuser gives the 4-letter code, the Expert refers to this manual to determine the correct lever sequence.

| Case Name | Example Code | 3 Pulley | 4 Pulley |
|---|---|---|---|
| Energy Case | `c h R k` | 010 | 0110 |
| Gravitational Case | `G m h R` | 100 | 0101 |
| Thermodynamic Case | `R k B T` | 110 | 1001 |
| Electromagnetic Case | `c e h R` | 101 | 1010 |
| Mixed Case | Any other combo | 001 | 0011 |
| Warning Case | Repeated letters (e.g., `c c h h`) | 011 | 0111 |